SOME NOTES ON THE SOUTH AFRICAN *ERYSIPHACEAE*.

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(Read April 21, 1915.)

(Plates XXX.-XXXV.)

The fungi belonging to the group *Erysiphaceae*, generally known as the "powdery mildews," are responsible for a number of very widespread diseases in this country, and in some cases cause serious damage. It is a well-known fact that in Europe the mildews on cultivated plants form perithecia comparatively seldom, and this condition prevails to an even greater extent in South Africa, therefore the work of accurately classifying these fungi is rendered difficult, as although *Oidium* spp. have been reported on a wide range of indigenous host plants, on these, too, perithecia are seldom found.

In his Monograph of the *Erysiphaceae*, Salmon has traced the identity of a number of these mildews which seldom form perithecia on cultivated plants, and in the accompanying list these oidial stages are provisionally assigned to the species to which they most probably belong.

The apple mildew (*Podosphaera leucotricha* (Ell. & Ev.) Salm.) is rather a serious pest in the orchards of the Orange Free State; trees four and five years old are seriously attacked. From an orchard in that province were obtained twigs bearing numerous perithecia of the fungus, and the identity of the pest was thus established; they were most plentiful on the variety known as Rome Beauty. Several outbreaks of the apple mildew have also been reported from various localities in the Cape and Transvaal Provinces.

Sphaerotheca pannosa Lév., the rose mildew, is prevalent wherever the rose is cultivated, and is very common and widespread in South Africa; indeed in some localities it is almost useless to cultivate susceptible varieties such as the Crimson Rambler. Although diseased plants have been under observation at all seasons during the past two or three years, the perithecia of this fungus have not been observed. There is only one case of the occurrence of this fungus on the peach (*Prunus persica*).

According to Salmon the perithecia of vine mildew (*Oidium Tuckeri*)

were not known for the first forty-seven years of its occurrence in Europe; then during an exceptional season in France abundant perithecia were formed, corresponding in every way to those of the American species, *Uncinula necator*. Possibly a similar occurrence may place beyond doubt the identity of the South African *Oidium Tuckeri*, but meanwhile this fungus is provisionally referred to *U. necator*.

Two new species of *Uncinula* are described, both from the Transvaal, one from the Pretoria District and the other from the Zoutpansberg. The former on *Ficus* sp. is near *U. Salicis*, but differs in dimensions and in the number and character of the appendages, the wall of the latter being distinctly scabrous in the lower half.

The *Uncinula* on *Pterocarpus* differs materially from the species described by Salmon on the same host (*U. incrassata*). It comes nearer to *U. tectona*, but differs considerably in the dimensions of perithecia, asci, and spores, and in the number of appendages.

A fungus which cannot be separated from the common and widespread *Erysiphe Polygoni* D.C., has been found on several plants belonging to the Euphorbiaceae and one Tiliaceae. The mildew of the garden pea and the sweet pea, which are fairly common, are probably to be referred to this species, but no perithecia have yet been found on either of their hosts.

The disease on different members of the Order Cucurbitaceae is one of the most troublesome pests caused by this group of fungi. It occurs throughout the country, and unless preventive measures are employed it almost invariably attacks cucumber, marrow, and pumpkin plants at the flowering period. It is responsible for a considerable amount of pecuniary loss. This fungus and the tobacco mildew (*Oidium Tabaci*) are both provisionally referred to as *Erysiphe cichoracearum*, Salmon having found the perithecia of this fungus in connection with both pests.

Oidium Tabaci occurs wherever tobacco is cultivated, and may attack the crop severely if the plants are at all crowded.

Erysiphe graminis is not very prevalent, and in only one case is reported as causing any serious damage.

The genus *Microsphaera* is not represented among the fungi collected up to the present.

The *Phyllactinia*, which occurs on several hosts, cannot be distinguished from the ubiquitous *P. corylea* (Pers.) Karst. The form on *Combretum* is more vigorous, and bears larger perithecia with more appendages than that on *Rhus*. On *Vigna angustifolia*, although numerous perithecia are formed, I have been unable to find mature asci, even in specimens collected in winter after the plants have been killed by frost. The characters of the perithecium, however, are undoubtedly those of *P. corylea*.

Oidiopsis taurica, which occurs on a number of herbaceous plants, has been placed in this species.

LIST OF *ERYSIPHACEAE* IN THE UNION MYCOLOGICAL HERBARIUM,
PRETORIA.

(The herbarium numbers are given in brackets.)

Podosphaera leucotricha (Ell. & Ev.) Salm. (Plate XXX.)

On *Pyrus malus* :

Clocolan, O.F.S., February, 1911 ; leg. I. B. Pole Evans (1079).

Oidial stage only :—

On *Pyrus malus* :

Pretoria, 14/1/07 (256).

Johannesburg, 24/10/07 and 13/1/11 (430, 448, 1077).

Bethal, O.F.S., March, 1914 (1291).

Sphaerotheca humuli (D.C.) Burr., var. *fuliginea* Schlecht.

On *Bidens pilosa* :

Pretoria, March, 1910 ; leg. E. M. Doidge (895).

Potchefstroom, 25/4/12 ; leg. P. van der Bijl (2257).

Pretoria, 26/4/13 ; leg. E. M. Doidge (6603).

On *Cosmos bipinnata* :

Pretoria, 31/3/11 ; leg. I. B. Pole Evans (1301).

Oidial stage only :—

? On *Senecio* sp. :

Johannesburg, 9/11/09 ; leg. J. Burt-Davy (774).

Garstfontein, Pretoria Dist., 8/4/11 ; leg. P. J. Pienaar (473).

Sphaerotheca pannosa Lev.

Oidial stage only :—

On *Rosa* spp. :

Pretoria, 31/12/05 ; leg. I. B. Pole Evans (110).

Piet Retief, 15/5/06 (120).

Rustenburg, 6/2/07 (238).

Silverton, Pretoria Dist., 13/12/07 (436).

Rustenburg, 21/11/07 (449).

Portuguese East Africa, 24/5/08 ; leg. C. W. Howard (514).

On *Rosa canina* :

Wellington, C.P., 22/2/12 ; leg. E. M. Doidge (2063).

On *Prunus persica* :

Groot Drakenstein, C.P., 7/2/12 (2250).

Uncinula necator (Schwein) Burr.Oidial stage only (*Oidium Tuckeri*):—On *Vitis vinifera*:

Rondebosch, C.P., 3/3/07 (273).

Pretoria, 9/4/07 (282).

Johannesburg, 24/4/07 (306).

Stellenbosch, C.P., May, 1913 (6608).

Uncinula polychaeta (B. & C.) Trac. & Gall. (Plate XXXI.)On leaves of *Trema bracteolata*.

Madjadje's Mts., Zoutpansberg Dist., June, 1906; leg. J.

Burt-Davy (181).

On leaves of *Celtis rhamnifolia*.

Fountains, Pretoria Dist.; leg. P. van der Bijl, 6/4/12 (2203);

28/3/12 (2336), 28/5/12 (2361).

Oidial stage only:—

On *Celtis rhamnifolia*.

Pretoria, 2/2/12; leg. P. van der Bijl (2096).

Uncinula aspera Doidge, n. sp. (Plate XXXIII.)

Epiphylla; mycelio arachnoideo, late effuso, albido, subpersistente; peritheciis sparsis, atro-brunneis, globosis depressis, 90–105 μ diam., cellulis distinctis, ca 15 μ latis; appendicibus 15–30, rectis v. leniter curvulis, simplicibus, esepatis, tenue tunicatis, totis hyalinis, basi 5–6 μ latis, asperulis, sursum incrassatis usque 9 μ , apice uncinatis v. interdum helicoideis, peritheci diametrum leniter superantibus 125–165 μ longis; ascis 4–6, ovatis v. subglobosis, sessilibus, 51–57 $\times$ 45–48 μ , 4–6 sporis; sporidiis 18–21 $\times$ 13–14 μ .

Hab. in foliis *Fici* sp., Wonderboom, Pretoria Dist., 14/7/11; leg. J. Burt-Davy (1838).

U. salicis affinis.

Uncinula Pterocarpi Doidge, n. sp. (Plate XXXII.)

Amphigena; mycelio epiphylla dense arachnoideo, latissimo per totam matricem effuso, cretaceo v. flavidulo, persistenti; mycelio hypophyllo tenui, effuso, albido; peritheciis numerosissimis, dense gregariis v. plus minusve sparsis, primo luteis, subglobosis, dein castaneis v. atro-brunneis, globosis depressis, 100–120 μ diam., plerumque ca. 114 μ , cellulis obscuris; appendicibus numerosis, 50–75, saepissime ca. 60, peritheci diametrum leniter superantibus, longitudine varia in quoque perithecio, simplicibus, esepatis, rectis v. leniter curvulis, 3–5 μ latis, sursum non incrassatis, apice uncinatis v. saepe subhelicoideis, hyalinis, basi demum crasse tuni-

catis ; ascis 8–12, ovatis $45-50 \times 20-28 \mu$, basi breviter pedicellatis, curvulis, 4-sporis ; sporidiis ellipsoideis hyalinis, $13-18 \times 12-13 \mu$.

Hab. in foliis vivis *Pterocarpus cerisei*, Duivelskloof, Zoutpansberg Dist., Transvaal, 9/8/11 ; leg. E. M. Doidge (1805).

U. Tectonae affinis.

Uncinula sp.

On leaves of *Combretum* sp.

Ledzee, Zoutpansberg Dist., 7/8/11 ; leg. E. M. Doidge (1793).

Perithecia immature.

Erysiphe Polygoni D.C. (Plate XXX.)

On *Acalypha* sp. :

Garstfontein, Pretoria Dist., 25/3/11 ; leg. Miss J. Erasmus (1266).

On *Jatropha Zeyheri* :

Near Pietersburg, Zoutpansberg Dist., 20/3/11 ; leg. F. Thomsen (1286).

Ehlanzeni, Umvoti Dist., Natal, 29/4/14 ; leg. E. M. Doidge (8248).

On *Jatropha natalensis* :

Ladysmith, Natal, 26/1/12 ; leg. I. B. Pole Evans (2030).

On *Triumfetta trichocarpa* :

Muckleneuk, Pretoria, 13/4/12 ; leg. E. M. Doidge (2291).

On host undetermined :

Barberton, 21/3/11 ; leg. C. P. Lounsbury (1279).

Oidial stage only :—

? On *Pisum sativum* :

Pretoria, February, 1907 ; leg. I. B. Pole Evans (269).

? On *Medicago denticulata* :

Constantia, C.P., 12/0/9 (*Oidium medicagineum* Thuem.), (736).

? On *Pisum sativum* :

Potchefstroom, 20/4/12 ; leg. (2259).

? On *Cassia occidentalis* :

Lourenco Marques, 25/4/09 ; leg. C. W. Howard (674).

Erysiphe cichoracearum D.C.

No perithecia seen.

On *Cucurbita Pepo* :

Pretoria, 8/1/06 ; leg. J. Burt-Davy (100).

Pretoria, 28/1/04 ; leg. J. Burt-Davy (180).

Pretoria, 2/2/07 ; leg. I. B. Pole Evans (268).

Pretoria, 15/2/07 ; leg. I. B. Pole Evans (270).

Kentani, C.P., 5/3/13 ; leg. A. Pegler (6581).

On *Cucumis sativus* :

Pretoria, 9/1/14 ; leg. A. Bottomley (7373).

On *Cephalandra palmata* :

P. P. Rust, 12/3/06 ; leg. J. Burt-Davy (132).

On *Momordica clementidea* :

Warmbaths, 18/3/09.

On *Nicotiana Tabacum* (*Oidium Tabaci* Thuem) :

Tzaneen, Zoutpansberg Dist., 1906 ; leg. J. Burt-Davy (135).

Piet Retief, August, 1906 (184).

Pretoria (190).

Daspoort, Pretoria Dist., 11/3/07 ; leg. D. Gunn (258).

Grahamstown, 5/3/07 ; leg. W. R. Dewar (276).

Barberton, May, 1907 (398).

Mozambique, 29/10/08 ; leg. C. W. Howard (643).

Rustenburg, 18/3/12 ; leg. P. van der Bijl (2197).

Erysiphe graminis D.C.

On *Triticum vulgare* :

Buffelsvlei, Lydenburg Dist., 23/9/14 (8374).

Oidial stage only :—

On *Hordeum vulgare* (Cape Barley) :

Wonderboom, April, 1906 ; leg. I. B. Pole Evans (37).

On *Hordeum vulgare* (Thibet Barley) :

Mycologist's Greenhouse, Pretoria, 8/1/07 (215).

On *Hordeum vulgare* (Chevalier Barley) :

Mycologist's Greenhouse, Pretoria, 8/1/07 (243).

On *Avena sativa* :

Mycologist's Greenhouse, Pretoria, 8/1/07 (214).

Phyllactinia corylea (Pers.) Karst. (Plates XXXIV., XXXV.)

On *Combretum Zeyheri* :

Muckleneuk, Pretoria, 29/4/11 ; leg. E. M. Doidge (1506).

Letaba Drift, Zoutpansberg Dist., 6/8/11 ; leg. E. M. Doidge (1806).

On *Rhus incana* :

Garstfontein, Pretoria Dist. ; leg. P. J. Pienaar, 24/5/11 (1533),
14/5/13 (6662).

On *Rhus discolor* :

Grootfontein, Harrismith Dist., 17/5/12 ; leg. P. van der Bijl (2317).

On *Vigna angustifolia* :

Muckleneuk, Pretoria ; leg. I. B. Pole Evans, 18/4/11 (1413),
22/4/11 (1510), 27/4/13 (6693).

Garstfontein, Pretoria Dist., 21/4/12 ; leg. P. J. Pienaar
(2252).

Oidial stage only (*Oidiopsis taurica* Lev.) :—

On *Tropeolum major* :

Pretoria, leg. I. B. Pole Evans, 17/3/08 (473), 6/2/09 (638, 945).
Kentani, C.P., 14/2/13 ; leg. A. Pegler (5668).

On *Zantedeschia* sp. :

Pretoria, 4/3/09 ; leg. I. B. Pole Evans (602).

On *Erythrina caffra* :

Natal, 11/4/11 ; leg. I. B. Pole Evans (1394).

On *Passiflora* sp. :

Pretoria, 30/3/11 ; leg. I. B. Pole Evans (1414).

On *Teucrium riparium* :

Pietermaritzburg, 8/4/11 ; leg. I. B. Pole Evans (1435).

Oidium spp. have also been collected on the following hosts :—

Buddleia salvifolia :

Pretoria Dist., 11/4/11 ; leg. E. M. Doidge (1373).

Cannabis sativa :

Potchefstroom, 20/4/12 ; leg. P. van der Bijl (2258).

Chenopodium ambrosioides :

12/11/08 (541).

Dombeya cymosa :

Table Mt., Natal, 18/4/11 ; leg. C. Fuller (1678).

Hermannia sp. :

Pretoria, March, 1910 ; leg. E. M. Doidge (896).

Hibiscus esculentus :

Daspoort, Pretoria Dist., 27/4/07 (393).

Lepidium capense :

Irene, Pretoria Dist., 23/1/08 ; leg. I. B. Pole Evans (445).

Leucas Martinicensis :

Wonderboom, Pretoria Dist., 18/3/11 ; leg. I. B. Pole Evans
(1297).

Pelargonium aconitifolium :

Pretoria Dist., 4/12/11 ; leg. J. Erasmus (1943).

Sisyrinchium sp.

Pretoria Dist., 16/11/11 ; leg. P. J. Pienaar (1963).

Solanum tuberosum :

Skinner's Court, Pretoria, 6/1/10 ; leg. I. B. Pole Evans (702).

SUMMARY.

Brief notes are given on the South African representatives of the Order *Erysiphaceae*. These cause a number of widely distributed and more or less destructive diseases of plants in this country, but they are not easily identified owing to the almost invariable absence of perithecia.

The species occurring in South Africa are enumerated, and a list given of the specimens contained in the Union Mycological Herbarium, Pretoria.

Two new species of the genus *Uncinula* are described.

THE BOTANICAL LABORATORIES OF THE
UNION OF SOUTH AFRICA,
PRETORIA.

EXPLANATION OF PLATES.

(All drawings were made with the aid of the camera lucida.)

PLATE XXX.

- A. Perithecium (*a*) and ascus (*b*) of *Podosphaera leucotricha* (Ell. & Ev.) Salm.
B. Asci of *Erysiphe Polygoni* D.C. on *Triumfetta trichocarpa*.

PLATE XXXI.

- Uncinula polychaeta* (B. & C.) Trac. & Gall.
A. Perithecium ; B. asci ; C. ends of appendages.

PLATE XXXII.

- Uncinula Pterocarp*i n. sp.
A. Perithecium ; B. asci ; C. ends of appendages.

PLATE XXXIII.

- Uncinula aspera* n. sp.
A. Perithecium ; B. ends of appendages ; C. asci.

PLATE XXXIV.

- Phyllactinia corylea* (Pers.) Karst., form on *Combretum Zeyheri*.
A. Perithecia ; B. asci.

PLATE XXXV.

- Phyllactinia corylea* (Pers.) Karst., form on *Rhus incana*.
A. Perithecia ; B. asci.

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